UNITED ARAB REPUBLIC.
[Egypt] MINISTRY OF AGRICULTURE

THE FIVE - YEAR AGRICULTURAL DEVELOPMENT PROGRAM

1960 - 1965

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The following is an outline of the Five Year Agricultural Development Program embrassing a brief description of the various projects included therein together with a statement concerning their costs, mode and period of implementation.

The Program covers twelve main sectors, namely, Soil Improvement, Crop Improvement, Diversification of Agricultural Production, Crop Protection, Livestock Production, Animal Health, Fisheries Development, Farm Mechanization, Food Industries, Agriculture Extension, Consolidation of Agricultural Holdings and Economic Studies. These together include 93 Project.

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MINISTRY OF AGRICULTURE
Foreign Relations Division

THE FIVE YEAR AGRICULTURAL DEVELOPMENT PROGRAM

The Situation and Outlook

It may be well, before presenting the agricultural development program of the Republic, to sketch the general framework within which it has been conceived and formulated as an integral part of the overall economic development program for the country.

The planning of the economic development program started by setting as its main objective the doubling of the national income within ten years starting from 1960; this is to be attained in two stages each covering five years. The various ministries then embarked on the formulation of their developmental projects within the general framework set by the Ministry of Planning. During this preparatory period, the closest cooperation was maintained between these ministries and the departments concerned in the Ministry of Planning.

The first five-year economic development program for the Republic calls for the investment of L.E. 1,697 out of which L.E. 392 million will be laid out in the agricultural sector, representing 23.5%

The agricultural development program has among its main objectives the solution of the two main problems confronting agriculture, namely, the shortage in cultivated land and the low productivity of the agricultural resources now in use.

Out of the total agricultural investment, L.E. 192.3 million will be invested in agricultural expansion projects, and L.E. 122.4 million invested in projects designed for increasing the productivity of already exploited agricultural resources. The breakdown of these investments is as follows:

Projects for agricultural expansion:

	L.E. million
* Irrigation work to provide 2 milliard cu. meters in preparation for the construction of the High Dam.	7.5
Irrigation and drainage projects in land to be reclaimed	11.4
Reclamation of 585,000 feddans in the Nile Valley	111.3
Recalamtation of 300,000 feddans in the New Valley and other related desert reclamation projects	62.1

Projects for increasing agricultural productivity:

Irrigation and drainage improvement	70.5
Projects contemplated by the Ministries of Agriculture and Agrarian Reform as well as other agricultural agencies	30.9
Agricultural mechanization, the addition of gypsum and other projects that may come under the private sector	21.0

The overall agricultural development program put by the Ministry of Agriculture will cost L.E. 54,876,298 distributed as follows:

	L.E.
Soil improvement	683,553
Crop improvement	11,228,106
Diversification of agricultural production	5,124,984
Crop protection	13,648,606
Livestock production	4,623,269
Animal health	8,645,349
Fisheries development	958,378
Farm mechanization	2,084,630
Food industries	503,396
Agriculture extension	2,437,868
Consolidation of agricultural holdings	4,126,011
Economic studies	812,148
Total	54,876,298

The implementation of this program is expected to yield an increase of 28.2% in agricultural production, expressed in tons as follows:

Cotton	292,905
Wheat	285,000
Maize	564,000
Sorghum	437,000
Rice	80,000
Sugar cane	13,902,768

It is also estimated that milk production will be increased by 58%, meat production by 26%, and fish production by 33%.

The value of agricultural production, on account of this increase, is expected to rise from L.E. 574 million to L.E. 675 million, whereas agricultural income will rise from L.E. 400 million to L.E. 479 million. The total number of those engaged in agriculture will rise from 3,245,000 to 3,800,000, thus providing extra employment for about 550,000 persons. At the same time, the wages paid to agricultural labourers will rise from L.E. 135 million to L.E. 171 million.

LAND IMPROVEMENT

A suitable soil is one of the basic elements upon which rests crop production as it provides the requisite environment for germination, growth and fruition. Increased attention should be directed to studying the soil's chemical and physical properties as well as to studying the problems for its improvement in order to provide the appropriate environment for the plants.

The successive cultivation of field crops in the country has led to decreasing the soil's nutrient contents and consequently to affecting the mineral balance. Taking into consideration the fact that Egyptian soils are originally poor in nitrogen and phosphorus and that the rates of fertilization do not at present correspond to the actual plant requirements, it has become imperative that these rates be raised to a proper level, which means almost doubling the supply of both organic and mineral fertilizers.

The area of the fallow lands which can be put under cultivation as soon as the necessary facilities are available and which are interspersed among the present cultivated areas amounts to about 300,000 feddans or 3%. Furthermore, the land areas which suffer from low productivity are about 200,000 feddans. This can of course be improved if the necessary drainage network is laid out and the requisite elements of fertility including fertilizers and soil conditioners are provided.

All this has led the Ministry of Agriculture to give increased attention to the study of the soil's chemical and physical properties, including soil salinity and alkalinity problems, with a view of making available to the growers the necessary information as to soil productivity, defects, problems and methods of improvement. However, it is felt that the availability of such studies should be accompanied by the provision of the necessary facilities for land reclamation at reduced costs either by offering loans from the Agricultural Cooperative and Credit Bank or to individual growers or by providing the cooperatives with the necessary machinery chemicals and soil conditioners.

The five-year program has provided for the promotion of research facilities, the provision of information necessary to growers on soil conditions, and the formulation of a fertilization policy. In regard to the first two objectives the program includes a number of projects, namely, the soil and classification survey, the soil salinity and the plant nutrition laboratories, the bacterial inoculation of the soils, and the study of the soil's requirements in gypsum and other soil conditioners.

As the objectives and mode of operation for the first three projects have been dealt with in a previous section, only the developmental aspects will be discussed here. The soil and land classification survey for the

cultivated area, which was originally scheduled for completion within 15 years starting from 1955, will be completed in ten years ending 1965. This will entail increasing the number of field workers and laboratory staff as well as the immediate provision of chemical apparatuses and automotive equipment. The survey will be repeated at ten-year intervals so as to study any changes that may have occurred during that period. The project's estimated cost is L.E. 240,510. As for the plant nutrition laboratory, this is to have its capacity raised to enable it to analyse 50,000 samples annually. Moreover, the program calls for the establishment of regional laboratories to assist the central laboratory at Giza. This will cost L.E. 124,003. The soil salinity and alkalinity laboratory will be provided with the necessary staff and equipment in order to carry out its increased activities, the estimated cost of the project being LE.147,140.

The project to study the requirements of weak soils in gypsum and other soil conditioners will be confined to the inspection of the growers' fields upon request with a view to determining the quantity of gypsum that may be added to the soil in the light of the analysis carried out. The project further calls for putting the lands under treatment under the technical supervision of the Ministry of Agriculture. The total cost involved is estimated at L.E. 95,840.

The project for the bacterial inoculation of legume crops is a continuation of the program that is being implemented by the Ministry of Agriculture in an area totalling 160,000 feddans. It is aimed at increasing the production of the bacterial nodules so as to inoculate 300,000 feddans annually. It will entail the establishment of well equipped bacteriological laboratories, the construction of a glass house for the study of the efficiency of outstanding bacterial strains, and the promotion of research

related to the utilization of plant and animal residues in organic fertilization. The total cost of the project is L.E. 76,060.

The other important aspect of the five-year program for land improvement is that relating to the fertilization policy. It covers three questions namely, fertilization rates, the requirements of the present and future cultivated area, and nutritive elements.

In regard to fertilization rates the program emphasizes the need for a flexible fertilization policy so that it may correspond with the changing conditions. Furthermore, the Ministry of Agriculture in the light of the studies carried out and prevailing conditions has devised fertilization rates for various crops, but, in view of the difficulty experienced in applying these rates others representing the average between the proposed and present rates have been selected for application as from the beginning of 1960. The fertilization requirements for each crop have been determined on the basis of the average area under this crop for the past four years.

The requirements of fertilizers for the area (totalling one million feddans) which will be cultivated under the long-term program for land reclamation are 232,000 tons of nitrogen 15%, 86,400 tons of superphosphate 15% and 6,250 tons of potassium sulphate 48%.

For the basin irrigation areas the requirements are 118,900 tons of nitrogen 15%, 12,200 tons superphosphate 15% and 550 tons of potassium sulphate 48%.

The total supplies of various fertilizers required may be summed up as follows:

Areas	Nitrogen 15%	F_2O_5 15%	P_2O 48%
Short-term expansion areas	129,400	50,150	1,570
Long-term expansion areas	232,000	86,400	6,250
Basin lands	118,900	12,200	550
Total	480,300	148,750	8,370

The program , in treating the question of nutritive elements, points out that nitrogen fertilizers are by far the most commonly used. It further indicates that the supplies of phosphorus fertilizer will have to be increased in order to let them keep pace with the proposed increased rates for nitrogen and potassium fertilizing. The program further points out that although the use of potassium fertilizers is still limited to certain crops such as potatoes, sugar cane and some fruits and vegetables, yet it will have also to be increased to ensure the proper balance between the various nutritive elements and also to meet the requirements of the areas that will be reclaimed in the western and eastern parts of the Delta after the High Dam has been built.

The program further draws particular attention to the need for increasing fertilizer consumption. In this respect it calls for bringing fertilizer prices within the limits of the purchasing power of small groups; for checking the production costs of the locally manufactured fertilizers so as to make them compatible with world prices; for fixing new prices for local and imported fertilizers on the basis of the price of the unit of the nutritive element for confining the importation of fertilizers to the

to the Agricultural Cooperative and Credit Bank or other recognized agencies; for making available at the proper time ample supplies of fertilizers to the growers; and for increasing the number of the existing centres for the distribution of fertilizer especially in remote areas.

In regard to organic fertilizers, the program emphasizes the need for increasing the supplies available in view of the poverty of Egyptian soils in organic matter (it does not exceed 1%). Moreover, the shortage in mineral fertilizers can be partly supplemented by the increased production of organic fertilizers.

As a means for promoting production from these fertilizers, the program calls for improvement of the daw manure with a view of raising its organic content from 8 to 15% and its nitrogen content from 0.3 to 0.5%. The conversion of the farm and slaughter house residues as well as city refuse into organic fertilizer with 18% of organic matter and 0.5% nitrogen is also suggested.

FIELD CROP IMPROVEMENT:

During the past ten years, the Ministry of Agriculture has been undertaking a number of projects for the improvement of field crops through the development of improved varieties, the expanded use of high quality seed and the control of plant pests and diseases. Although an appreciable increase in the average yield per feddan and general output of most crops has been accordingly obtained, yet the full productive capacity of the cultivated area from these crops is not fully utilized. Therefore, the five-year program has drawn up a policy for the further improvement of field crops. This policy calls for the following:

(1) The development of new varieties distinguished for their high yield, good consumption qualities and high immunity to major pests and diseases.

(2) The renewal of the seeds of commercial varieties at fixed regular intervals so as to ensure the provision of a continued supply of pure high quality seed to the growers. This also entails a follow-up in the behaviour of the seed lots produced by the contractors in order to ensure their purity.

(3) The expansion of the areas assigned for the propagation of high quality seed. This will require continued expansion in the areas assigned to the nucleolus and the nucleus.

(4) The subjection of seed production in all stages to full and precise technical control, whether in regard to the production of the foundation and registered seeds by the Ministry of Agriculture or to the production of registered and certified seeds by the contractors. The breeder's supervision should be extended over to the production of the foundation seeds instead of being confined only to the production of nucleolus as is the case at present. A cadre of technical personnel should be developed so as to ensure full supervision over the production of the registered and certified seeds by the contractors. Moreover, the period elapsing between the production of the breeder's seeds and their receipt by the growers should be shortened.

(5) The allocation of the varieties to the areas best suited to their development so as to ensure the production of the highest yield and to prevent variety mixing.

(6) The expansion of various experiments designed to find out the best agronomic practices, such as the date and method of cultivation, rates of seeds, application of fertilizers, water requirements and pest and weed control in order to ensure obtaining the maximum yield possible.

(7) The establishment of provincial research stations throughout the country to carry out on-the-spot investigations and researches which will help in solving the problems peculiar to each province.

(8) The recruitment of the necessary technical staff for the conduct of the research program outlined and for the requisite control over the production of high quality seed.

(9) The establishment of a Fund for the improvement of Egyptian cotton with the object of encouraging the growers to maintain the purity of their cotton and to deliver it to the ginneries as early as possible. It can thus be possible to provide the required amounts of cotton seed at an early date before cultivation.

(10) The issue of two laws, the first providing for the registration of field crop varieties, and the second to control the production of the seeds intended for sowing.

(11) A reduction in the prices of high quality seed produced by the Ministry of Agriculture so as to encourage the growers to used them.

The program thus outlined will cost L.E. 11,228,106.

Cotton: The policy of the Ministry of Agriculture in this respect aims not only at the maintenance of the quality of the existing commercial varieties but also at their continued improvement, in addition to the development of new varieties which can cope with the changing patterns of demand in the market. In furtherance of this policy the Ministry of Agriculture has undertaken several measures. In the first place, it has resorted to variety zoning to ensure the successful growth of cotton varieties and also to prevent their mixing. Secondly, ginneries have been assigned in each locality for the ginning of one variety in order to avoid variety mixing during the ginning process. Furthermore, certain ginneries have been assigned for ginning cotton propagation seed. Thirdly, to ensure the availability of an ample supply of certified seed, the area assigned for their production has been increased from 247,000 feddans in 1957 to 441,000 feddans in 1959.

The Ministry of Agriculture has made available to these areas the highest standard of available seed in terms of both quality and purity as they are destined for sowing the entire area under cotton. Moreover, the Ministry assigns annually what has come to be known as the concentration areas where cotton purification against off-type plants is practised through putting all the stages of sowing, thinning, flowering, picking and ginning under the official control and supervision of the technical staff of the Seed Propagation Section of the Ministry of Agriculture. Fourthly, the Egyptian Cotton Improvement Fund established in 1959 has started granting seed producers including growers, merchants and ginners renumerative rewards against the accepted seed in order to encourage them to produce

The [illegible] thus outlined will cost L.E. [illegible]228,100.

Cotton. The policy of the Ministry of Agriculture in this respect has not only [illegible] of the quality of the existing commercial varieties and [illegible] a continual improvement, in addition to the [illegible] which can [illegible] changing [illegible]

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[illegible] of these terms the [illegible] quality and purity as [illegible] Moreover, the [illegible] between the concentration [illegible] through [illegible] picking and ginning under the [illegible] control and supervision of the technical staff of the Seed Propagation Section of the Ministry of Agriculture. Formerly, the Egyptian Cotton [illegible] Fund established in 1959 has started giving seed producers (including growers, cooperatives and ginners) remuneration premiums against the cost of seed in order to encourage them to produce high quality seed, to pay more attention to the purity of their cotton and to ensure their early despatch to the ginning factories. The Fund which has a special financial identity derives its capital from the extra dues that are levied on ginned cotton. The Fund's establishment has enabled the Ministry of Agriculture to fill all the gaps that previously existed in the seed propagation system.

In addition to the above-mentioned measures, the Ministry of Agriculture has taken a number of steps to promote the purity of Egyptian cotton, these included the laying down of a meticulous system for their renewal, the testing of the cottons intended for seed production for yarn strength, and the follow-up of the behaviour of seed lots by defining their source, purity, ginning outturn and spinning strength. The Ministry of Agriculture also registers all the necessary information on those with whom it contracts for seed production to discover their response to its instructions. Together with these, a rounded-out program for research covering various fields related to cotton production(including breeding, agronomy, pathology and entomology, fibre technology and ginning) has been drafted and will be partly financed by the Fund.

In furtherance of the previously mentioned measures, the five-year program includes a project for cotton improvement through the development of new varieties distinguished for high quality and yield, the production of ample high quality seed to cover all the area under cotton, and the exclusive eradication of the off-type plants from cotton fields. The cost of this project will be L.E. 596,840. Another project calls for strengthening the Spinning Test Mill at Giza with a view to enabling it to study and test the various components of the whole ginning system as affecting lint quality, to develop the fibre test on the single plants of high quality seed, to pay more attention to the variety of their cotton and to ensure their early despatch to the ginning factories. The Fund which has a special financial identity derives its capital from the cess dues that are levied on ginned cotton. The Fund is [illegible] the Ministry of Agriculture to fill all the gaps that previously [illegible] cotton system.

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[illegible] measures, the five-year [illegible] cotton improvement through the development [illegible] for high quality and yield, the production of ample high quality seed to cover all the area under cotton, and the extensive eradication of the off-types from the cotton fields. The cost of this project will be L.E. [illegible],000. Another project calls for strengthening the Spinning Test Mill in Giza with a view to enabling it to study and test the various components of the whole ginning system as affecting lint quality, to develop the fibre testing [illegible] single [illegible] new selections and hybrids, to carry out fibre tests on samples of Egyptian varieties to determine their behaviour in different localities and in different seasons as a meausre of keeping close control over the quality of the crop, and to test the yarn of breeding familieis of extra long-staple varieties on counts higher than 60 to determine their efficiency and ability for being spun on fine counts. This project will cost L.E. 59,270.

To ensure fuller control over the production of seed in the ginneries, the program provides for the initiation of a project which aims at ensuring the supply of pure seeds to the growers, guaranteeing the treatment of the seed intended both for cultivation or crushing against boll worms, maintaining the quality of the cotton strains developed by the Ministry of Agriculture, and making available accurate information on the statistical situation of cotton and the quantities of seed produced. This project will demand the strengthening of the technical staff responsible for supervising the ginneries. It will cost L. E. 305,060.

__Wheat:__ The improvement of this important staple crop has centered during the last few years on the development of a number of varieties distinguished for their high yield, good tillering and rust resistance. The area assigned to the propagation of these improved varieties was raised from 46 feddans in 1957/58 to 16,848 feddans in 1959/60, out of which there were 3,600 feddans for the production of the foundation and registered seeds. One third of the wheat area will thus be covered by certified seeds in 1962/1963.

Furthermore, the Ministry of Agriculture has adopted variety zoning for wheat. Accordingly, the country has been divided into four zones, namely, the northern part of the Delta, the southern part of the Delta, Middle Egypt and Upper Egypt. In the first zone, where wheat rusts prevail, the new variety Giza 144 will be grown on account of its high resistance to black and yellow rusts and to lodging. In the second zone, Giza 150 will be grown because of its high resistance to both black and yellow rusts, in addition to Giza 145 which, although it has a moderate resistance to yellow rusts, yet is distinguished for its high resistance to black rust and to lodging. To the third zone will be assigned Giza 146 and Giza 148. In Upper Egypt Giza 142 will be grown on account of its early maturity and high resistance to black rust and lodging.

The project visualized by the five-year program calls for the breeding of new varieties distinguished for their high yield and resistance to rusts and smuts, the adoption of meticulous system for the production of seed whereby the breeder annually produces ample supplies of improved seed to feed the area under wheat and exercises full technical supervision over the production of foundation and registered seed in an area totalling 5,000 feddans on the farms of the Ministry of Agriculture. Furthermore, full technical supervision will be exercised by the Ministry over the production of certified seed in the farms belonging to the contractors covering an area totalling 56,000 feddans as well as over the distribution of the seed thus produced among the growers in an area totalling 500,000 feddans, or about one third of the total area under wheat.

Barley: On account of the extensive breeding program, which has included about 7,000 imported varieties, the Ministry of Agriculture has been able to increase the average yield per feddan from 0.86 ton in 1952 to 1.05 ton in 1959. As with the previous crops, variety zoning has been resorted to, to ensure betteryyield.

The project visualized by the five-year program provides for the development of new varieties distinguished for their high yield and resistance to net blotch. Furthamore , it calls for covering the whole area under barley with renewed high quality seed at intervals of three years. This will be done through a meticulous system for seed propagation which will provide for the full supervision of the breeder over the production of the foundation and registered seed over an area of 300 feddans on the farms of the Ministry of Agriculture, and the technical supervision of the Ministry over the production of certified seed in the farms belonging to the contractors in an area totalling 3,600 feddans, which will provide one third of the seed requirements of the area under barley. The total cost of the Wheat and Barley Project will be L.E. 158,980.

Rice: The cultivation of this crop, which was initially limited to the saline lands of the northern parts of the Delta and some areas of the Fayum Province, has been extended to many parts of the Region where the water requirements of the crop can be met. Experiments conducted by the Ministry of Agriculture have resulted in the development of a number of high yielding varieties which have established themselves very well in both local and foreign markets. Improvement work has also included other qualities, such as the nutritive value, milling out-turn, cropping qualities and the production of varieties suited for parboiling.

The project visualized by the five-year program calls for the further improvement of the crop through the development of new varieties distinguished for their high resistance to blast, high yield and outstanding bleaching and cooking qualities. It also calls for ensuring the supervision of the breeder over the production of the foundation and registered seed over an area of 1,000 feddans as well as that of the Ministry of Agriculture over the production of certified seed in the farms of the contractors covering an area totalling 15,000 feddans. The project will cost L.E. 110,490.

Maize: Considerable attention has been given to this crop, which is the staple food crop for the majority of the people in the country. To meet growing requirements and to cover part of the deficit experienced in its production, the Ministry of Agriculture's policy has aied at the generalization of the production of hybrid maize, which gives a yield higher by 25% than the other local varieties. In addition it is designed for spreading the cultivation of high yielding ordinary varieties such as the " American Badri" which gives 15% increase in yield over the rest of the varieties. In furtherance of this policy the Ministry of Agriculture has been able to raise the production of hybrid maize from 8.4 tons in 1952 to 4,200 tons in 1959, which covered about 240,000 feddans, or 13% of the area under maize. Moreover, the Ministry has been encouraging the formation of companies and agencies for the production of hybrid maize and has been rendering to them every possible assistance including the provision of the single hybrids necessary for the production of the hybrids.

The project visualized by the five-year programme calls for the further improvement of the crop through the development of new varieties distinguished for their high resistance to blast, high yield and outstanding [illegible] qualities. It also calls for encouraging the [illegible] the production of [illegible] foundation and [illegible] feddans as well as that of the [illegible] production of certified seed in the farms [illegible] covering [illegible] feddans. The project

The objective set for the improvement of this crop aims at the development of varieties and hybrids distinguished for their high yield and their resistance to prevalent diseases and to borers. Furthermore, it calls for the expansion in the area under hybrid maize so as to reach 600,000 feddans or one third of the area under maize, the expansion in the production of self-polinated pure strains for further use in the production of single hybrids on an area of 2,000 feddans to be distributed among companies and agencies for cultivation in an area of 15,000 feddans for the production of double crossed hybrids, which in turn will yield enough hybrid seeds to cover 600,000 feddans. The project also calls for the production of high quality seed from the " American Badri" veriety by producing annually the foundation and registered seed on an area of 320 feddans that will give seed ample enough to cultivate 8,000 feddans for the production of certified seed, which in turn will annually cover 200,000 feddans or one third of the area under this variety. Therefore, by the end of the period scheduled for the completion of this project, two-thirds of the area under maize will have been put to hybrids and the remainder to the " American Badri". The total cost of this project will be L.E. 154.760.

Sorghum: The breeding program initiated by the Ministry of Agriculture for this crop has resulted in raising the average yield per feddan from 1.20 ton in 1952 to 1.34 ton in 1959 on account of the development of high yielding varieties such as the yellow grained Giza 54 and the white grained Giza 114. The project scheduled for implementation under the five-year program aims at the further development of new varieties with higher yields and resistance to smuts and the production of ample supplies of high quality seed from Giza 114 so as to cover the total area under the crop with pure

The objective set for the improvement of [illegible] crop [illegible] is the development of varieties and hybrids distinguished by their high yield [illegible] their resistance to unfavourable [illegible]. [illegible] the area under [illegible] to reach [illegible] the area under [illegible] [illegible]

[illegible]

[illegible] agriculture [illegible] from [illegible] the development of high yielding varieties [illegible] the yield [illegible] under the five-year [illegible] development of new varieties with higher yields [illegible] supplies of [illegible] the total area under the varieties are seeds every three years. The breeder's supervision over the production of the foundation and registered seeds will be maintained on an area of 100 feddans and the supervision of the Ministry of Agriculture will be over the production of certified seeds on an area of 3,000 feddans, production from which is to be distributed over an area of 150,000 feddans annually. The total cost of the project will be L.E. 14,950.

Onions: The breeding programs carried out by the Ministry of Agriculture for the improvement of this crop have resulted in the development of an outstanding variety. "Improved Giza 6", which gives a yield higher by 22% above other local varieties. The programs have also included experiments on the production of hybrid onions which, apart from the bulbs' uniformity give a yield higher than the local varieties by 40%. The project in the five-year program calls for the development of new varieties distinguished for their qualitative and quantitative characteristics and high resistance to white rot and thrips. The propagation system for the variety " Improved Giza 6" will ensure the breeder's control over the production of the foundation, registered and certified seed produced from an area of 150 feddans of onion bulbs and 300 feddans of onion seed which will produce a supply of seed ample enough to cover an area totalling 7,000 feddans of onion bulbs annually. The cost of the project is L.E. 36,655.

Leguminous crops: Like other field crops, the Ministry of Agriculture has been able to develop a number of improved varieties of leguminous crops including beans, lentils, fenugreek, chickpeas and lupinus that are distinguished by their high yield and high nutritive values especially in terms of protein content. The project provided for in the five-year program

calls for the further development of new varieties highly resistant to brown rot and rust for (beans) and the quick decline and root rot(lentils, fenugreek, lupinus and chickpeas). It also aims at the replacement of the old varieties by improved ones and the production of high quality seed ample to cover the area under these crops every three years as it also calls for exercising full control by the breeder and the Ministry of Agriculture over the production of the foundation, registered and certified seed. The cost of this project is L.E. 67,545.

Bersim: A number of varieties including " Khadrawi Nabatat", which excel in Upper Egypt and the basin irrigation areas, have been produced by the Ministry of Agriculture. They all give a yield of green crop and seed higher by 10% than the prevailing local varieties. The project contemplated for this crop aims at the further development of new varieties of clover ((high in crop yield and resistant to rust) in addition to the development of new varieties of summer green fodder crops free from hydrocyanic acid, For seed propagation the project provides for exercising full supervision by the breeder over the production of the foundation and regsitered seed from an area totalling 1,250 feddans on the farms of the Ministry of Agriculture in regard to clover, and 50 feddans in regard to green fodder summer crops. Technical supervision will be maintained by the Ministry of Agriculture over the production of certified seeds for clover and green fodder summer crops on an area of 10,000 feddans and 500 feddans respectively on the farms belonging to the contractors. The total cost will be L.E.43,545.

calls for the further development of new varieties highly resistant to drought and root rot (Bowal) and the quick cooking and good [illegible], strength, lustre and chewiness. It also aims at the replacement of the [illegible] varieties [illegible] and the production of high quality seed [illegible] those [illegible] [illegible] [illegible]

[illegible] which [illegible] [illegible] and [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] registered seed [illegible] the Ministry of Agri-culture [illegible] under [illegible] will be maintained by the Ministry of Agriculture from the production of certified seeds for [illegible] gram [illegible] at the rate of 10,000 maunds and 500 maunds respectively on the farms belonging to the Government. The total cost will be Rs.[illegible].

Oil Crops: The breeding program carried out by the Ministry of Agriculture has resulted in the production of a number of high yielding varieties for both groundnuts and sesame. The project visualized under the five-year program aims at the further development of high yielding varieties both rich in oil and highly resistant to prevailing diseases. The propagation system calls for the supervision of the breeder over the production of the foundation and registered seeds in an area of 65 feddans for groundnuts and 5 feddans for sesame, in addition to the technical supervision of the Ministry of Agriculture over the production of certified seed in an area of 8,00 feddans for groundnuts and 150 feddans for sesame on the farms belonging to the contractors, in order to cover annually one third of the area under the two respective crops. The cost of the project is L.E. 29,950.

Sugar cane: The Ministry of Agriculture has achieved considerable progress in replacing old sugar cane varieties by new ones distinguished for their high yield, with the result that the average yield per feddan has sprung from 35.26 tons in 1952 to 37.73 tons in 1959, thus increasing the aggregate output from 3,261,773 tons to 4,191,782 tons. This led to a decrease in the country's imports from 127,000 tons in 1952 to 22,000 in 1958 in addition to the export of 27,000 tons in 1958 that were necessitated by existing trade agreements. The project set for the development of sugar crops is aimed at the development of new varieties of sugar cane distinguished for high crop yield and sugar content and for their high resistance to virus and other diseases. The project is also designed for the trial of sugarbeet as an alternative crop for sugar production, the production of sugar cane seeds

as well as of high quality seedlings on an area ranging between 2,000 to 3,000 feddans lying in Middle and Upper Egypt to cover at least one quarter of the sugar cane area. The total cost of this project is L.E. 101,350

Flax: The cultivation of this crop was in the past dependant on the export of raw fibres to the foreign markets. However, as a result of the severe competition faced by them in those markets, the area under flax declined from 20,000 feddans in 1955/56 to 14,000 feddan in 1958/59. However, as the local annual requirements from linseed oil can be met from the cultivation of 2,000 feddans, this automatically covers the local requirements in flax fibre(estimated at 2,500 tons) since they can be produced from 15,000 feddans. Therefore, the contemplated project aims at the cultivation of 20,000 feddans of flax annually, which will yield a crop that will meet the requirements of both the crushing and weaving mills in addition to producing a surplus of 850 tons of raw fibres which may be exported.

To meet the seed requirements of this area, the project provides for the propagation of the foundation and certified seeds on an area of 200 and 700 feddans respectively. It further calls for the generalization of the Giza 4 variety, which is noted for its high yield and resistance to rust diseases, as well as for the development of improved varieties by undertaking the necessary research on fibre quality. As a means for protecting the local crop, the project calls for the prevention of importing flax seed for crushing purposes, except with the approval of the Ministry of Agriculture and the undertaking of the necessary measures to prevent their infiltration into the hands of the growers.

Kenaf: This crop can be successfully grown on a wide scale both from the economic and agricultural points of view. Furthermore, its fibres can replace jute in the manufacture of sacks and other products, thus minimizing the country's heavy imports in jute and its products. The total estimated area for meeting the country's requirements, especially after the expected expansion in the fertilizer and sugar cane industries, is estimated at 50,000 feddans. The project provided for in the five-year program calls for expansing kenaf cultivation over a five-year period on an area of 50,000 feddans, especially in localities such as in the provinces of Beheira, Fayum and Sharkia which do not give a rewarding cotton crop. It further calls for the production of registered seed from an area totalling 300 feddans for further production of certified seeds by the contractors of the General Company for Jute Products. This project will cost L.E.32,565.

Tobacco: Though the cultivation of this crop dates back to 1589, it was stopped in 1890 on economic grounds. However, in view of the increased imports, which amount to 12,000 tons annually valued at L.E. 6,000,000, since 1956 the Ministry of Agriculture has embarked on a number of experiments with a view of exploring the possibilities for developing tobacco cultivation. The project visualized aims at furthering these experiments, which will be concentrated in areas such as El-Tahrir Province where the cultivation of cotton and grain does not prevail. The cost of this project will be L.E. 23,600.

In addition to the above-mentioned projects directly concerned with the improvement of various field crops, there are the followings of an overall nature:

Kenaf.- This crop can be successfully grown on a wide scale both from the standpoint of soil and climate [illegible]. Furthermore, its fibres [illegible] a large proportion of those now taken in jute, thus mini- [illegible] the total [illegible] especially [illegible] in [illegible] five-year [illegible] period on [illegible] the provinces [illegible]

[illegible] following [illegible]

[illegible] 000,000.

[illegible] of experiments [illegible] mechanization, [illegible] which will be [illegible] the cultivation of [illegible] this project will be [illegible]

[illegible] directly concerned with the improvement of [illegible] the following "as an overall outcome":

Seed Production Procedure: The researches conducted for the development of improved new varieties will not yield their full impact unless these varieties are propagated and widely distributed among the growers in a purified manner. Therefore, the program attaches great importance to the propagation system to ensure the production of high quality seed. The procedure to be followed by the Ministry of Agriculture is based on the production of foundation and registered seeds at farms belonging to the Ministry of Agriculture, and the production of the certified seeds by contracting with big and medium growers whose farms are under the technical supervision of the Ministry of Agriculture. The seed thus produced is then distributed among the growers. This will annually cover the whole area under cotton and one third of the area under other field crops. The following table shows the contracted areas in 1959 as compared with 1952:

Crop	Area per feddan	
	Year 1952	Year 1959
Cotton	82,451	446,225
Wheat	26,027	50,412
Barley	1,686	2,667
Beans	788	11,670
Rice	2,121	9,529

However, the successive handling of pure seeds over a number of years subjects them to the various factors which contribute to their mixture and the decrease of their productivity, and consequently the deterioration of their qualities. It has therefore been projected in the five-year program to renew the cotton seed annually and that of other crops at intervals of three years.

Moreover, the program for ensuring the production of high quality seeds has provided for subjecting the whole process to full technical supervision on the part of the Ministry of Agriculture. This will be done on an area amounting to about 600,000 feddans, which will produce the seeds required for the cultivation of 3 million feddans for which the seed of various crops will have to be annually renewed.

The program further calls for reducing the price of high quality seeds so as to encourage growers to use them. Of the total costs of the project amounting to L.E. 5,321,760, a sum of L.E. 1 million has been allocated for this purpose.

Seed Inspection: Seeds meant for sowing are subjected to a number of tests in order to determine their purity, rate of germination and freedom from entomological and pathological infestations. The Ministry of Agriculture has had a fairly long record in this respect, as its Seed Inspection Laboratory dates back to 1920. Later, two more were established, at Tantah for Lower Egypt and at Minia for Upper Egypt. With the expansion in the production of high quality seed the number of samples examined has increased rapidly. They included those tested for research purposes, amounting to 48,750 samples in 1959/1960 as against 18,500 samples for the period 1947/1952. The project visualized in this respect by the five-year program calls for developing of the three laboratories by providing the necessary staff and equipment, which will cost L.E. 261,430.

The improvement of agronomic practices: Until recently, studies in plant physiology were of an academic nature without giving due attention to the solution of production problems. Therefore, this project has been formulated with the idea of studying various agronomic practices in order to appraise their impact on the growth and yield of the crops; it further calls for the application of the findings of these studies on a nation-wide basis. The cost of the project is L.E. 99,020 .

Control of weeds: Experiments have been carried out by the Ministry of Agriculture for the chemical control of weeds in wheat, barley, and rice fields. The findings have been applied on an area totalling 50,000 feddans. But it is contemplated under the five-year program to generalize this method in all wheat, barley and rice fields under the full control of the Ministry of Agriculture. Twenty well equipped field teams each under the supervision of an agronomist will be organized to undertake weed control work on an area of 200,000 feddans within a five-year period at a total cost of L.E. 157,662.

The study of crop-water requirements: This project, which has been discussed in a previous part when dealing with the judicious use of water resources, further aims at sutdying the effect of irrigation rotations on the growth of crops and the effect of irrigation water on the salt content of the soil in the root zone. In view of the significance of these studies both in terms of the savings that may be effected in the available water resources and the production of higher crop yields, it is planned to establish 12 investigation stations in the provinces of Beheira, Kafr el-Sheikh, Dakahlia, El-Tahrir, Sharkieh, Menufieh, Giza, Beni-Suef, Fayum, Minia, Qena and Nubarieh. The project will cost L.E. 302,017.

The establishment of Agricultural Research Stations: So far research activities have been concentrated in the Research station at Giza. But with the varied environmental conditions of the country, it is necessary to bring research workers in close touch with local problems: this called for the establishment of 12 provincial research stations where all branches of agricultural research could be carried out. Moreover, the station will assist in diffusing proper information to the farmers and help them in overcoming their problems.

Four stations will be established at Sakha, Gemiza, Sids and Nubarieh in 1960, three at Fayum, Malawi and Mataana in 1961, and three more at El-Tahrir, Gabel el-Asfar and Shandawil in 1962. The total cost will be L.E. 2,455,402.

Promotion of the Experimental Farms: This project has been set to enable the experimental farms belonging to the Ministry of Agriculture to face the new responsibilities resulting from the implementation of the various projects relating to the production of foundation and registered seeds, in addition to other activities necessitated by the five-year program. The project calls for the erection of the necessary establishment and the provision of the requisite equipment and agricultural machinery. It will cost L.E. 895,005.

Im

IMPROVEMENT OF HORTICULTURAL CROPS

Following the policy set by the Ministry of Agricultural calling for the diversification of agricultural production, there has been a notable increase in the area put to horticultural crops. The area under fruits rose from 93,664 feddans in 1952 to 125,554 whereas for vegetables it rose from 260,881 to 476,888. This enabled the country to meet a major

[illegible]

[illegible] 1922 to 125,21[illegible] population in

[illegible] to 476,088. This meant the country [illegible] part of the local requirements in addition to developing a surplus for export which in 1959 exceeded the 1952 level by 15,200 tons for fruits and 46,200 tons for vegetables.

Fruit Production

The five-year program points out that the future expansion in fruit production should not only be aimed at attaining self-sufficiency but also at the production of standardized commercial varieties that are suited for export and processing purposes. On the basis of the fruit requirements of local and foreign markets in both its fresh and processed forms, the program fixes the area to be put under fruit at 105,000 feddans and gives priority in this respect to the good clayey land which have good drainage facilities, and there after to sandy soils which have been reclaimed and put to leguminous crops for a number of years. The program further indicates that it is preferable that the new areas be developed in large adjacent units so that packing houses may be established near the production centres. Moreover, advisory and credit facilities should be made available to the growers. The program points out that, for export purposes, there should be assigned 90,000 feddans of which 60,000 feddans to citrus, 20,000 feddans to seedless grapes, 5,000 to mangoes and 5,000 to bananas. For the local market there should be assigned 15,000 feddans, of which 5,000 is to be under pears, 7,000 under deciduous fruits and 3,000 under nuts(pecan and almonds). However, it is expected that about 50% of the crop produced from the area assigned to export will not be suitable for this purpose, and there will thus be a surplus which can be channelled to the local market. For this and future expansion, the program moreover establishes fixed

zones for various kinds of fruit so as to ensure the best environmental conditions for their growth in addition to facilitating their marketing, packing and processing.

The projects provided for in the program for the development of fruit production may be summed u as follows:

Development of fruit nurseries: This project aims at the production of the requisite number of seedlings to cover the proposed expansion in the fruit area. This will require the assigning over a three-year period of an area of 1,200 feddans for the development of nurseries which will produce 37 million seedlings of various fruits. It is provided that the area assigned to each nursery should not be less than 200 feddans of good clayey soils lying in midst of the main production centres. The nurseries are to be run under the management of the Ministry of Agriculture, since the facilities available to private nurseries will not guarantee the production of the requisite quality. This project will cost L.E. 942,600.

Promotion of fruit research: This project aims at strengthening the fruit research station belonging to the Department of Horticulture so as to enable it undertake the research which will be necessitated by the proposed expansion in fruit production. This will entail the recruitment and training of the necessary technical staff and the provision of necessary equipment. It will cost L.E. 74,500.

Vegetable Production

While the production of vegetables is mostly concentrated in Lower Egypt, especially around the big cities, it is less prevalent in Upper Egypt, save for Giza Province on account of its proximity to Cairo. Realizing the good opportunities that wait for Egyptian vegetables in foreign markets, the five-year program has called for expanding the area under the major export crops such as tomatoes, potatoes, watermelons, garlic, artichokes, peas and beans. However, it is envisaged that about 50% of the crop produced for export will not be suited for this purpose, and thus there will be a surplus which will be channelled into the local market for fresh or processed consumption. Moreover, the program provides for a concomitant expansion for local consumption in the production of vegetable crops over an area totalling 30,000 feddans.

The execution of the program will entail implementing the following projects.

Vegetable improvement: This project aims at promoting vegetable production through the development of new varieties best suited for the requirements of both local and foreign markets and distinguished for their high yield and high resistance against pests and diseases. It is also aimed at the production of the foundation and registered seeds in the farms belonging to the Ministry of Agriculture on an area of 260 feddans, in addition to the production of certified seeds by the contractors under the Ministry's supervision. This project will cost L.E. 128,390.

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[illegible]. It is also stated

[illegible] in the same

[illegible] area of 250 hectares. In

addition to [illegible] of specified works by the contractors under the

[illegible]. This project will cost L.E. 178,560.

Propagation of potato seed: This project aims at raising the production capacity of the seeds produced for the Nili crop so as to match those produced for the summer crop. This will be done by putting the potato fields assigned for the production of seeds for the Nili crop under the technical supervision of the Ministry of Agriculture, in addition to studying the reasons which contribute to the deterioration of the productive power of the seeds obtained from the summer crop. The project will cost L.E. 55,150.

Improvement of the agronomic practices: This project is aimed at the study of the various agronomic practices and nutritional requirements in order to attain a better vegetable crop both from the quantitative and qualitative points of view. Undertaking these studies will entail establishing the necessary laboratories and greenhouses. This project will cost L.E. 31,660.

Flowers and ornamental plants: Flowers are a promising export crop, especially to European countries during the winter season. However, the production of flowers on a commercial basis with the standard requisite to meet the requirements of foreign markets is not possible in view of the non-existence of efficient nurseries. Therefore, it is planned to establish a nursery covering an area of 15 feddans in the garden attached to Qubba Palace for the production of seeds and bulbs. This nursery will be run jointly by the Ministry of Agriculture and the General Organization for the Promotion of Exports.

Medical and Aromatic Plants: The production of [illegible] supplies of medicinal and aromatic plants as well as their extracts is required in order to meet the growing requirements of the pharmaceutical, perfume and insecticide industries. Moreover, it points out that medical and aromatic plants should not be grown for export purposes unless there are established regular markets for them. However, it does not preclude growers from exporting part of their produce in case there is before cultivation an advance commercial commitment with foreign importers. The project will cost L.E. 127,985.

Propagation of timber trees: The development of timber tree production has received considerable attention in order to offset part of the country's increasing requirements in wood and wood products. However, in view of the prevailing environmental conditions, it has been decided not to develop the cultivation of timber trees in the form of artificial forests but rather to have them planted along public roads, canals and drains, and also as windbreaks for protecting orchards and farms especially in areas where sand-dunes prevail.

In this respect two projects have been provided in the five-year program. The first calls for the propagation of 25 million seedlings for planting along canals and drains in the areas contemplated for reclamation, covering about half a million feddans. This will require the establishment of five nurseries, each with an area of 25 feddans, for the annual production of 5.2 million seedlings, of which half a million will be poplars. This project will cost L.E. 446,795. The second project aims at cultivating timber trees along the public canals in the already cultivated areas over a distance of 6,600 kilometres. This will require

the production of about 3 million seedlings. The project will cost L.E. 1,021,346. Together with the aforementioned projects, there is another which provides for the establishment of a dry·kiln for undertaking the necessary studies and research on local woods in order to find out their suitability for industrial purposes from the technological point of view. The cost of the project is L.E. 135,401.

Along with the above mentioned projects, the five-year program includes the following overall projects, which are designed for the development of horticultural crops in general.

Provincial Research Stations: To ensure that the research conducted by the Ministry of Agriculture corresponds to environmental conditions and is directed to the solution of local problems, it is intended to establish seven well-equipped research stations in various parts of the country. They will be located at the Barrage(Southern Delta), Nubarieh(Western Delta), Sids(middle Egypt), Sabahia(North western Delta), Fayum(for Fayum Province), El-Tahrir Province (for sandy soils) and Gabal el-Asfar (representing the projected expansion areas and sewage farms). It will cost L.E. 606,827.

Furthermore, there is a project for strengthening the existing research stations belonging to the Department of Horticulture in order to increase their efficiency and render them capable of meeting the added responsibilities which will have to be born on account of the implementation of the various projects embodied in the five-year program. This will entail the provision of the necessary staff and equipment as well as the erection of a number of establishments and nurseries. The project will cost L.E. 1,198,668.

[illegible] The project will cont[illegible]

[illegible] existing [illegible] in order to [illegible] ing the effect [illegible] of the implementation [illegible] progress. This will entail [illegible] as well as the erection [illegible] and structures. The project will cost L.S. [illegible]

Provision of Advisory Services: This project calls for the promotion of advisory and extension services in the field of horticulture with a view to enlightening the growers on the latest findings of research work carried out by the Ministry of Agriculture and enabling them to use such findings in solving the problems encountered. The project, which will entail the strengthening of the staff of the extension service, will cost L.E. 179,620.

The establishment of a botanical garden: The program stresses the necessity of establishing a botanical garden not only in regard to the work relating to the introduction and acclamatization of foreign plants, but also for the extensive study of the local flora. It has therefore provided for assigning an area of 100 feddans in the gardens attached to Qubba Palace for the botanical garden and its accompanying premises, including greenhouses, laboratories and a library. This project will cost L.E. 125,457.

Associated with the above-mentioned projects designed for the improvement and diversification of horticultural crops, the program includes the two following projects:

Promotion of Bee-keeping: The project provided for in the five-year program calling for the promotion of the bee-keeping aims at the generalization of modern bee-hives which give a higher yield than the native ones, the propagation and spread of the high yielding strains such as Cornioliani, Italian and Caucasian strains, and the conduct of research especially on the control of hornet Vespa orientalis which inflicts considerable damage to the bee-hives. The project will cost L.E. 16,885.

Promotion of silk-worm keeping: This is an important rural industry which can provide the growers with an additional reasonable income. The project visualized aims at the production of 24,000 boxes of eggs annually. This will entail the production of 400,000 seedlings of mulberry at an annual rate of 80,000 . The project will cost L.E. 44,700.

CROP PROTECTION

Plant pests constitute a threat to the national economy on account of the great losses they inflict upon various crops. The total annual loss caused to agricultural production by these pests is estimated at L.E. 62 million, of which L.E. 40 million is in cotton(25% of the crop), L.E. 8 million in wheat and maize, L.E. 2 million in stored grains, and L.E. 8.5 million in fruit and vegetables. However, in the past few years the Ministry of Agriculture has made considerable progress towards controlling these pests through the provision of the necessary pesticides and equipment and the organization of field campaigns against the major pests. Comparing 1952 with 1959, it can be seen that the area that has been treated against cotton pests has risen from 19,542 feddans to 2,077,123 feddans, while for other field crops it has risen from 2,083 feddans to 83,899 feddans and for fruit trees from 2,975,246 to 6,615,893 between those years.

The five-year program has laid out a nation-wide plan for pest control based on dividing the country into a number of zones to each of which will be assigned a pest control unit equipped with pest control and automotive equipment. Pest control work, which is at present mainly the responsibility of the Ministry of Agriculture, is intended to be gradually shifted to pest control cooperatives. However, until such organizations are founded , the

Ministry will continue to undertake this work. The total cost of this plan will be L.E. 13,648,606, and it involves the implementation of the following projects:

The Pest Control Units: This project aims at the organization of pest control units in the various zones of the country, each covering an area of 5,000 feddans. These units will be established and supervised by the Ministry of Agriculture and/or the pest control cooperatives. Throughout the year, these units will organize periodic campaigns against various pests. They will number 1,200, of which 500 will be governmental and 700 cooperative, and will be established within nine years in the following order:

Year	No. of Units	
	Govt.	Co-op.
1960	35	15
1961	35	15
1962	35	15
1963	100	125
1964	100	125
1965	100	105
1966	95	100
1967	-	100
1968	-	100

Starting from the tenth year, the governmental units will be converted into cooperative ones at a rate of 100 cooperative per year until they all become cooperative by the fourteenth year from the date on which the project started. This conversion will also include the transfer of the title of buildings, equipment and supplies to the cooperative units, as these will be initially supplied by the Ministry of Agriculture.

Each unit will be run by a qualified pest control officer under the supervision of an inspector who will be responsible for twenty units. The unit will be composed of four teams, each comprising one assistant pest control officer, one mechanic and twelve trained workers; it will be supplied with 12 sprayers, two dusters and a spraying motor. The Ministry's assistance to the cooperative units will be by defraying the salary of the pest control officer and paying the price of one motorcycle and the cost of its fuel and maintenance. It will further charge the growers for the control work done in their fields in addition to 5% collection dues, this will cover the sums incurred by the Ministry in the purchase of the pesticides and the payment of the worker's wages. After the transfer of the units to the cooperatives, the expenses incurred by the Ministry of Agriculture covering the salaries of the personnel and the cost of the fuel and maintenance of the automotive equipment will amount to L.E. 472, 712 annually. The project also calls for the organization of pre-service training centres for pest control officers and field workers.

Insect control: In regard to crop insects, the five-year program includes two projects. The first is for the biological control of cotton-leaf worms through the introduction and propagation of cotton predators in the cotten fields; this will cost L.E. 23,405. The second project calls for extending to other crops the control campaign which was started in 1959 against the fruit fly in the citrus orchards over an area of 17,000 feddans.

Plant Disease Control: The program includes a project for the control of bunchy top in bananas through the organization of wide campaigns against the disease in both the fields and nuseries with a view to eradicating the diseased plants in the proper way. Moreover, technical advice will be tendered to the growers on methods of controlling the disease. The cost of this project is L.E. 55,500. Another project calls for the control of citrus virus diseases through the propagation of virus-free seedlings; this will cost L.E. 68,548. Furthermore, in view of widespread bacterial rot in maize, a project has been included for the control of this disease through testing the varieties, strains and hybrids by inoculation during selection in order to develop immune strains. Along with this, studies will cover the effect of various agronomic practices (including time of sowing, irrigation and manuring), on the spread of the disease. This project will cost L.E. 24,020.

Survey of plant pests: This project aims at surveying plant pests throughout the year and determining the losses caused by them. It also visualizes the establishment of a forecasting service to report to the growers on the spread of plant pests and diseases to enable them take the necessary measures early. The project will entail the establishment of

a laboratory for recording the ecological, physical and biological factors affecting the degree of infestation just as it will also call for collecting the requisite data at periodic intervals. This project will cost L.E.37,186.

Plant Quarantine: For the improvement of the Plant Quarantine Service, the program includes two projects. The first calls for strengthening the plant quarantine premises at Alexandria, Port Said, Suez and Port Tewfiq along with the enforcement of the internal plant quarantine measures on some pests to prevent their spread from one zone to the other. This project will cost L.E. 258,865. The second project provides for the establishment of an isolation garden in order to put under control the plants and seeds which are introduced for experimental purposes so that they may be treated or eradicated in case of infection. The total cost is L.E. 70,160.

In addition to the above-mentioned projects, the program has treated the question of making available the necessary supplies of chemicals and equipment for pest control. It calls for manufacturing locally all these items that are possible otherwise, consideration should be given to the formulation of pesticides locally as well as to the erection of assembly lines for the equipment. As to the distribution of pesticides and pest control equipment, the program maintains that this should be left to the agricultural cooperatives, the Agricultural Cooperative and Credit Bank or other private agricultural agencies and that the role of the Ministry of Agriculture should be limited to the assistance of these agencies in manufacturing or procuring their requirements in these items, as well as checking their prices in order to guarantee reasonable rates for the growers. However, insofar as that the Ministry is still itself undertaking pest

control operations, it cannot be precluded from procuring the necessary supplies of pesticides and equipment. Another point to which the program draws particular attention is that relating to the necessity of setting up workshops as well as the provision of ample supplies of spare parts. For this purpose it calls for attaching to the governmental pest control units workshops for repair and maintenance which will also have stores for spare parts.

The program further points out the necessity for undertaking the necessary measures to ensure the purity of the pesticides and their conformity to specifications. In this respect it calls for developing the laboratory belonging to the Ministry for the analysis of pesticides, which will require a sum of L.E. 38,110.

LIVESTOCK PRODUCTION

The policy set by the Ministry of Agriculture for the promotion of this important sector of agricultural production aims at raising the productivity of livestock through the development of improved strains and or the breeding of foreign breeds that have proved to be suited to local conditions, through the control of animal pests and diseases, through the promotion of research and finally through confining the farm animals to the main reason for which they are usually kept, namely, milk and meat production rather than work.

With this policy in view, the five-year program for the development of livestock production has been formulated at a cost of L.E. 4,623,269. This program is based on the following principles:

(1) The development of the breeding herds on the farms of the Ministry of Agriculture and the breeding of proven sires through continued selection and their distribution for mating, thus upgrading the farm animals.

(2) The utilization of artificial insemination to make wider use of the available proven sires.

(3) The expansion in the breeding and propagation of high quality poultry breeds and the distribution of fertilized eggs as well as chickens at reduced prices.

(4) The promotion of research.

(5) The establishment of a plant for the manufacture of concentrated feed for the Ministry of Agriculture's farms.

This program has been translated into the following projects:

Buffalo improvement : The project for the improvement of buffaloes is aimed at developing their productivity both in terms of milk and meat and making available proven sires, as their scarcity has resulted in developing sterility in buffaloes to as much as 30%. The project calls for the development of the breeding stock on the Ministry's farms so as to bring it to a total number of 2,000 head, the purchase of 2,000 calves over a two-year period, the adoption of modern breeding techniques, the breeding of proven sires through continued selection and their distribution among the big growers and agricultural centres in northern part of the Delta for upgrading the peasants' cattle, and the disposal of the female in excess of the requirements of the breeding stock by sale to private breeders. This project will cost L.E. 1,111,660.

Cattle improvement: There are two projects for the improvement of cattle. The first aims at developing the productivity of the native cattle through crossing with imported pure Frisian cattle. This will entail the establishment of well equipped breeding stations on the Ministry's farms, the importation over a three-year period of 1,450 Frisian heifers in calf and 50 sires; the breeding of proven sires for distribution free of charge among big growers and agricultural centres for mating with the peasants cattle, and the disposal of females in excess of the requirements for breeding stock by sale to breeders. This project will cost L.E. 1,107,742. The second project aims at improving Damietta cattle. These are concentrated in the northern part of the Delta and may be considered the only recognized breed in the country. The project calls for concentrating breeding work on the Damietta cattle in the Ministry's farm at Siru and developing this farm so as to accommodate a herd of 120 head , the adoption of modern breeding techniques and the breeding of proven sires through continued selection and their distribution free of charge among big growers and agricultural centres in northern part of the Delta for upgrading the peasants' cattle, and the disposal of the females in excess of the requirements of the breeding stock by sale to private breeders. This project will cost L.E. 121,110.

Sheep Improvement: The increasing demand for fine and medium textured wools by the wool industry has called for directing increased attention to sheep improvement. This will be done through continued selection in the native breeds to develop their productivity both in terms of meat and wool production, the continuation of the breeding program started in 1950 with a view to verifying the suitability of

imported sheep breeds to local conditions, and their crossing with native breeds on a wide scale in case their suitability is proved. The project provided for in the program calls for the establishment of sheep breeding stations at the Ministry's farms at Mallawi, Shandawil and Matana, and the development of those already existing at Sakha and Mahalet Mussa in the northern part of the Delta. It also calls for the importation of 270 ewes and 30 rams of the Merino breed, and the purchase of 800 head of the Ossimi, Barqi and Rahmani native breeds to supplement the breeding stock belonging to the Ministry of Agriculture. It further provides for undertaking research on wool technology and biology. This project will cost L.E. 87,369.

Poultry Improvement: It may be stated that the main factor which limits the spread of the high producing breeds of poultry is the non-availability of sufficient numbers of tested eggs and chickens for distribution among the farmers. It is therefore necessary to make them available in ample numbers so as to meet the increasing hatching requirements. This task is at present being mainly undertaken by the Ministry of Agriculture poultry farms, but unfortunately because of their limited productive capacity they cannot cope with these requirements. Furthermore, it is noted with regret that the native hatcheries upon which most farmers still depend are about to disappear on account of the problems they encounter.

However, to meet this situation and to ensure the sustained development of this important sector of the livestock industry, the five-year program has provided for the following projects:

[illegible]

However, the need [illegible] this direction [illegible] the sustained development of this important sector of the American economy, the Eisenhower program has provided for the following measures:

The first project calls for developing the productive capacity of the poultry farms belonging to the Ministry of Agriculture so as to produce 800,000 chickens a year, of which 730,000 will be distributed to farmers at reduced prices and the rest kept for breeding purposes. It also calls for distributing the fertilized eggs in excess of the farms' requirements among the native hatcheries, and for deliniating fixed zones for various breeds with a view to ensure their purity and consequent increased production. This will entail the establishment of three poultry farms at Mallawi, Shandawil and Matana in Upper Egypt, each with a capacity of 3,000 chickens and developing the capacity of the already existing farms. It will also entail the provision of the necessary incubators, brooders and other equipment to meet this expansion. This project will cost L.E. 470,445.

Another project calls for the promotion of the hatching industry by replacing the native hatcheries by modern incubators. This will entail the establishment of an artificial hatchery in Menufieh Province and another one in Fayum, each with a capacity of 370,000 eggs during the incubation season, which runs from October to March in Upper Egypt and to April in Lower Egypt. The growers in the locality of the two hatching units will be able to hatch their eggs free of charge or at very reduced prices. The project will cost L.E. 36,854. Together with this, there is a project which calls for encouraging the owners of native hatcheries by granting them bonuses for increased egg production and the establishment of additional hatching units. The project will cost L.E. 75,000. The five-year program also includes a project for the establishment of a farm for aquatic poultry on Menzala Lake with

a view to increasing local production from ducks which can feed on fish refuse and other marine products. This will cost L.E. 157,568.

Promotion of Research: To ensure the successful management of the above-mentioned project and to study the effect of the breeding program as well as the environmental conditions on the level of livestock production, it has become necessary to promote research facilities in this branch. This will entail the development of the already existing laboratories for wool technology and biology, animal breeding and physiology, animal nutrition and poultry breeding, in addition to the establishment of two research units for the physiology of reprodcution and animal nutrition at Sakha Farm. This will cost L.E. 135,460.

The manufacture of dried milk: This project aims at providing a reliable source of milk from national production to assist the development of permanent child-feeding programs in schools and maternal and child welfare centres. It also provides children and expectant and nursing mothers with milk either wholly or partially skimmed. It will be distributed free during the first five years of production.

The Government, in collaboration with UNICEF, has established a plant at the Ministry of Agriculture's farm at Sakha with a productive capacity of 800 tons of dried milk and 400 tons of table butter. It is costing L.E. 1,209,671.

The establishment of this plant, besides helping to improve the feeding of vulnerable groups, will encourage milk production in the locality and will thus raise the grower's income. Three collecting centres have been built for assembling milk. The plant is now in its final stage of completion.

LIVESTOCK PROTECTION

The losses that affect the animal wealth as a result of pests and diseases is estimated at 25% of the value of this important sector of agricultural production. Of particular significance among the epidemics and infectious diseases which affect livestock and poultry are rinderpest, haemorrhagic septicaemia, intestinal and blood parasites, Newcastle, white diarrhoea, bovine tuberculosis, foot-and-mouth disease and the Malta fever.

Realizing the importance of protecting farm animals especially since 70% of them are owned by small farmers who are not able to provide ample medical care for their animals , in 1954 the Ministry of Agriculture formulated a comprehensive program for the control of animal and poultry pests and diseases through the establishment of 329 veterinary centres in various parts of the country. It further strengthened the veterinary laboratories so as to produce ample supplies of vaccines, sera and diagnostic biologics to meet the expansion in the veterinary services. The Ministry was thus able to attain self-sufficiency for the country in these products.

However, to ensure fuller protection for livestock, the five-year program has called for the completion of the veterinary centre network, the promotion of the Quarantine Service, the development of vaccine and sera production, the supplementation of the provincial diagnostic laboratories, the promotion of research and experiments on some diseases, the training of veterinarians, technicians and workers on control and treatment work, and the generalization of artificial insemination centres. This program will cost L.E. 8,645,349 and includes the following projects:

Veterinary Centres and Services: In furtherance of the project which was set in 1954, 88 veterinary centres have been established in the provinces of Minia, Fayum, Menufieh, Kaliubieh and Kafr el-Sheikh, each covering from 10-15 villages and servicing about 20,000 animals and 50,000 poultry. The five-year program has provided for the establishment of the remaining 241 centres at a cost of L.E. 5,999,840.

Together with this there is a project for developing the central veterinary Hospital at Abbassieh, which will cost L.E. 7,000. Another project calls for the protection of cattle against rinder-pest by preparing the necessary supplies of vaccine and the organization of periodic campaigns at five year intervals for the immunisation of cattle against this disease. This project will cost L.E. 141,206.

Production of vaccine and sera: To meet the projected expansion in the control of animal and poultry pests and diseases and to fulfil the growing demand of neighbouring countries, a project has been formulated for developing the production of vaccines, sera and diagnostic biologics. This will entail the preparation of virus and bacterial vaccines at the rate of 6 million doses of Newcastle vaccine, 6 million doses of Fowl Pox vaccine, one million doses of Fowl plague vaccine, 100,000 doses of Spirichitosis vaccine, 300,000 doses of goat virus vaccine of cattle plague, 200,000 doses of Lapinised vaccine of cattle plague, 100,000 doses of sheep Pox vaccine, 25,000 doses of South African horse sickness and 3.5 million doses of Septicimia vaccine. These supplies will be naturally increased in the future with the establishment of additional veterinary centres. The project also provides for strengthening the various departments of the Vaccine and Serum Laboratory. This will cost L.E. 263,522. Togetgother with this there is a project for strengthening the three provincial

Veterinary Centers and Services. — In furtherance of this program which was begun in 1941, 25 veterinary centers have been established in the [illegible], Tehran, [illegible] and [illegible]. Each [illegible] [illegible] [illegible] [illegible]

[illegible]

[illegible] tons of [illegible] [illegible] 3.5 million [illegible] will be in the [illegible] [illegible] additional veterinary centers. The [illegible] Veterinary [illegible] Laboratory. This will cost [illegible] with [illegible] the above mentioned diagnostic laboratories at Alexandria, Minyeh and Kafr el-Sheikh, as it also calls for the establishment of further laboratories at Shibin el-Kom, Fayum, Dakahlia, Qena, Aswan and Suez Provinces. The total cost will be L.E. 164,470.

Moreover, a project has been included in the program for undertaking the necessary exploratory studies on the nature of some important diseases and epidemics. This will entail the establishment of one unit for the typing and propagation of foot-and-mouth disease viruses, one for infectious reproductive diseases, one for the experimental transmission of rinderpest, and one for the study of snails acting as an intermediate host for liver flukes. This will cost L.E. 188,180. There is also a project for the promotion of research and studies on anti-rabies vaccines, which will cost L.E. 44,380. Furthermore, there is an accompanying project for the destruction of stray dogs as a means for controlling this disease. This will cost L.E. 90,650.

Veterinary Quarantines: To ensure the protection of native cattle against invading diseases, a project has been included in the program for enlarging the Veterinary Quarantine premises at Alexandria, Suez and Shallal in Upper Egypt. This will cost L.E. 515,510.

Artificial Insemination: This project, which has been discussed under livestock production, aims at the generalization of artificial insemination by establishing 319 centres throughout the country. It will cost L.E.1,009,056,

Training of veterinarians: As the implementation of the livestock protection program will require the use of well-trained veterinarians, technicians and workers, it is planned to establish a permanent training centre which will offer a three-month training course to veterinarians and a one month

training course to workers. This training centre, which will be supplied with the necessary equipment, supplies and book references, will cost L.E. 93,895.

Promotion of Cairo Zoological Garden: In order to make the Zoological Garden at Cairo worthy of the noted place it occupies among world Zoological gardens, a project has been included in the program to enrich its collections and to display most of the animals in their natural habitats. This, together with the establishment of further rockeries and pens, will bring the total cost of the project to L.E. 136,610.

AGRICULTURAL MECHANIZATION

Mechanization is an important means for raising the productivity of the agricultural resources already available and reducing the costs of production in so far as due regard is paid to the socio-economic conditions of the country. The five-year program has dealt with this question from various angles and has come up with interesting conclusions.

It points out that mechanization should be done by the private sector as exemplified in agricultural cooperatives and companies and that the role of the Government should be confined to providing these organizations with the necessary facilities and guarantees that will ensure the success of mechanization under the supervision of the Government agencies concerned. However, the program stresses that it is the Government's responsibility to supervise the activities of private organizations and to conduct the necessary research and investigations as well as the provision of advisory services. Nevertheless the program indicates that in the early stages of mechanization the Government will itself have to undertake some of the services destined for the

private sector through the establishment of service, maintenance and repair stations to act as models for those to be established at a later stage by private entreprise.

The five-year program for agricultural mechanization will cost L.E. 2,084,630. This program has covered the various aspects related to mechanization, including the study of the country's requirements in various types of agricultural machinery, the provision of spare parts, the training of technicians and workers, the establishment of workshops for maintenance and repair, the effect of mechanization on agricultural labour, the requisite measures for the generalization of mechanization, the testing of various types of agriculture machinery and the projected effects of mechanization. All these aspects will be discussed in the following pages.

Requirements in Machinery

The studies carried out by the Ministry of Agriculture have revealed that these requirements can be defined as follows:

Tractors: On the basis that the mecahnization of cotton cultivation is the determining factor in assessing the number of tractors required and that the area under cotton is nearly 1,800,000 feddans, the number of tractors needed will be 22,000 classified according to their power as follows:

1,000 tractors of more than 55 h.p.
13,000 tractors of about 45 h.p.
8,000 tractors of about 30 h.p.

There are at present 300, 1500, 3,200 tractors respectively of the above-mentioned types. The number of tractors required for supplementing this force is therefore as follows the total cost of these tractors being L.E. 27,500,000:

700 tractors with 55 h.p.
11,000 " " 45 "
4,800 " " 30 "

Tillage equipment: The total requirements of the country in this group of machinery, after excluding those already existing, are as follows, their total cost being estimated at L.E. 5 million:

12,000 chisel cultivators
5,000 different types of mould-board and disk ploughs.
1,000 sub-soiler ploughs.
2,000 land levellers
5,000 disk harrows.

Drilling Machines: Small drilling machinery for use in wheat, barley, and other grain fields can be introduced on a limited scale. These are estimated at 500 units, costing L.E. 100,000.

Power units for irrigation: On the basis that the irrigation of one feddan requires 1/6 lifting power, the country's requirements can be estimated at 1,000,000 horse power, of which 450,000 is already available. The remaining power will require machinery at a cost of L.E. 20 million on the basis that the price for a complete unit per horse power is L.E. 35.

Pest control equipment: The country's requirements in this equipment is as follows, the total cost being L.E. 2,057,200:

57,600	Sprayers
10,000	Dusters.
100	Large spraying motors.
2,000	Small spraying motors.
1,000	Sprayers for weed control.

Threshing machinery: The country's requirements are estimated at 6,500 combines, of which 500 are at present available. Therefore, there is a balance of 6,000 combines which will have to be added at a total cost of L.E. 10 million.

To sum up, the total cost involved in fulfilling the country's requirements in various types of agricultural machinery (expressed in Egyptian pounds) is L.E. 64,190,500, distributed as follows:

Tractors	27,500,000
Soil preparation	5,000,000
Drilling machinery	100,000
Power units for irrigation	20,000,000
Threshing machinery	10,000,000
Pest control equipment	2,057,000

Fuel and oils: The annual requirements of various types of machines from these items are as follows:

Tractors	2,576,000
Power units for irrigation	4,298,000
Spraying motors	7,000

This gives a total cost of L.E. 6,881,000, which will decrease after the utilization of the electric power to be generated from both the Aswan and the High Dams.

The provision of spare parts: A sum of L.E. 1,187,000 is required annually for the purchase of the necessary spare parts. The program, in order to make them available in adequate supply suggests that the following measures be adopted:

1) High priority should be given to the import of spare parts.
2) Companies dealing with machinery should be forced to assign, on a permanent basis, a percentage for the purchase of spare parts equalling 10% of their annual imports during the past five years. Ample control should be exercised over the companies transactions so as to ensure their adherence to this quota.
3) The Ministry of Agriculture should fix, in agreement with the companies concerned, a certain percentage for profits on spare part transactions.
4) The policy set for the importation of spare parts for tractors and motors should be continued until this machinery can be manufactured locally, as the manufacture of spare parts alone is impractical.

The training of technicians and labourers

Throughout its various stages, the success of mechanization depends on the availability of the requisite number of well trained and skilled technicians and labourers to operate, maintain and repair the machinery.

In addition to the provision of the necessary training to about 10,000 tractor drivers who are already in service, the program calls for offering pre-service training to about 12,000 drivers who will be engaged for operating the projected fleet of tractors. The provision of this training could be provided by utilizing the facilities available to the companies and cooperatives engaged in the import of agricultural machinery. Furthermore, the program calls for the recruitment of 3,000 foremen to work for the cooperative's service stations and for private growers.

Their functions will be to undertake on the spot a check on the functioning of the machinery as well as minor repairs. They will also inspect the maintenance of the machinery at periodic intervals and determine the dates of their overhauling. The program further points out that it is preferable that these foremen be graduates of the Industrial Secondary Schools after receiving some practical training at governmental or private workshops for a period of one year. Furthermore, training course should also be provided for the shcool instructors, both in local workshops and abroad.

The program also calls for the provision of courses in agricultural machinery at the College of Agriculture and Engineering so as to enable graduates to operate the machinery, in addition to being suited types for various agricultural operations and to render technical advice on the operation and maintenance of the machinery. Moreover, it recommends that research and studies on agricultural machinery should be promoted both by the Ministry of Agriculture and the Universities.

Maintenance and repair

In regard to the maintenance and repair of the machinery belonging to private individuals, the program suggests that companies should establish well equipped service stations at the provincial level, provided that the number of the tractors sold by any one company in the province is not less than one hundred. In case the number is less, the company concerned will then undertake to do the repairs either at its main workshop or in agreement with one of the competent private workshops in the province under its own supervision and that it be held responsible for these repairs. As to the machinery belonging to the cooperatives and other agencies, it is recommended, in view of their sizeable numbers, that special service stations be established for them. Each station is to look after 200 tractors and cover an area of

50,000 feddans and is to undertake the overall repairs of the machinery in addition to the supply of spare parts.

The project set in this respect calls for the establishment of two service stations, one at the Ministry's farm at Sakha to serve Kafr el-Sheikh, Dakahlia and Beheira Provinces in Lower Egypt, and the other at the Ministry's farm at Mallawi to serve Minia and Assiut Provinces in Upper Egypt. To each station will be attached two mobile workshops equipped with the necessary equipment, supplies and spare parts. Each centre will do the overall repairs for 250 tractors, 62 irrigation and 62 threshing and other machines. This project will cost L.E. 489,530.

The effect of mechanization on manpower

The program in this context classifies the machinery into two types, namely, those which replace animals and those which replace manpower. However, the program has mainly concerned itself with the first type, which has a very limited effect on manpower. According to the estimate made in the program, the mechanization of ploughing operations will create a surplus of 250,000 labourers. On the other hand the utilization of pest control equipment for all crops will call for the employment of 150,000 workers. Likewise, irrigation by pump-lifting will entail the engagement of 20,000 workers for operating the machines. Therefore, the total number of the labourers who are expected to be unemployed is 80,000, out of whom 60,000 will be engaged if mechanized pest control work is generalized, as there will be some others employed by the developing industries. However, the program in this respect indicates that threshing machines should not be purchased with an automatic feeder, except only in areas where there is a shortage in manpower, as this process can absorb the labourers who are

[illegible]

[illegible] measurement of Fluid [illegible]

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Marine fisheries: There are three projects for the development of marine fisheries. The first calls for the exploration of new fishing grounds in the Mediterranean and Red Seas. This will require, in addition to the research vessel Mabhes, belonging to the Hydrobiological Institute at Alexandria, the procurement of a modern one to undertake the necessary biological investigations, including the study of fish reproduction, behaviour and migration; this will cost L.E. 541,674. The second project calls for the survey of the Egyptian shores and the improvement of fishing gear and methods. This will entail the purchase of a fishing boat and the procurement of various kinds of equipment for experimental and demonstrational purposes. The project will cost L.E. 91,200. The third project provides for the establishment of a research station on the Red Sea and will cost L.E. 29,520.

Inland Fisheries: For the development of inland and lake fisheries it is planned to establish three research centres on lakes Burolos, Qarun and Manzala to study the nature of these lakes and their suitability for breeding various kinds of fish, as well as to supply the lakes with fries fingerlings. The project will cost L.E. 77,470. Another project aims at the establishment of a research centre on Lake Nasser above the High Dam, as it is planned to develop fish production in this lake so as to offset the deficit that will develop in the production of the Nile fisheries on account of the construction of irrigation works as well as of the abolition of the basin irrigation system and the drainage of parts of the present lakes. This project will cost L.E. 80,910. Furthermore, to provide the lakes with a continuous supply of fries, a project has been formulated to develop of the three fish ponds belonging to the

Ministry of Agriculture. This will cost L.E. 100,960.

Water-logged areas: The project designed for the development of fish production from the water-logged areas along the Mediterranean coast calls for the construction of artificial openings to connect them with the sea. Following the project set in 1956 for the exploitation of Bardawil lake extending between Port Said and Arish, a project is proposed in the program for connecting the Port Fuad marsh with the sea and the Suez Canal by two openings. A similar project is also proposed for the Mersa Matruh lagoon, which covers an area of 1,200 feddans to the west of Mersa Matruh itself on the Mediterranean Coast. Four openings are also proposed for connecting the sea with the water-logged areas covering 1,400 feddans in the Alamein Depression. The program further calls for the control of fishing operations in the lakes in order to develop their production.

Fisheries Statistics: In order to develop reliable and accurate statistics concerning the present status of the fisheries, including those for size of catch and the varieties composing it, the program has provided for continuing the project started by the Ministry of Agriculture to improve fishery statistics. This project, in addition to developing appropriate sampling technique for recording the various kind of fish during the catch season, aims at helping the fisheries administrators and research workers to a better understanding of the role that techniques have to play in solving the problems confronting them in the task of fishery development in the country. This project, which will entail strengthening the fishery statistics machinery, will cost L.E. 36,644.

Improving fishermen's conditions: The program stresses the importance of improving the fishermen's condition as a means for increasing their productivity and consequently that of the fishery resources. It further suggests that cooperatives for lake fisherman be organized along the lines of the twenty two cooperatives which have been formed by the master-fishermen and fishermen of the mechanized boats. Further, as a means for encouraging fishermen to frequent distant fishing grounds, the program recommends the exemption from taxes as for a period of five years of refrigerated mecahnized boats of more than 100 horse power operating in these areas.

Fish marketing : As a means for improving fish marketing, the program recommends that the establishment of refrigerators and cold storage be expanded and that the control of the wholesale and retail fish markets be centralized in one governmental body, as more than one department are at present responsible for this. Furthermore, it proposes the organization of cooperative fish markets.

Processing of marine products: The last link in the program for fisheries development calls for the industrialization of marine products, including fish, sponge, shells, etc., which in addition to raising the return from these resources will develop new industries.

FOOD INDUSTRIES

The role of the Ministry of Agriculture in regard to food industries is basically confined to the research aspect in order to assist the industry in solving the problems it encounters. Therefore, the five-year program's projects in this field have been confined to the establishment and/or

supplementation of the dairy and food industry laboratories belonging to the Ministry of Agriculture in order to enable them to undertake this task. These projects will cost L.E. 503,396.

The first project calls for the establishment of a pilot dairy plant with a view to intensifying the research conducted by the Ministry in this field and supply the dairy factories with their requirements in the various substances needed for the manufacture of dairy products, such as starters, colouring substances and rennet. It will also serve as a vocational training centre. The project will cost L.E. 119,340.

The second project calls for supplementing the food industry research laboratories belonging to the Ministry of Agriculture through establishing units for dehydration, fermentation, concentrates and sauces as well as supplying the necessary equipment for the existing units for distillation, extraction and the manufacture of carbonated beverages. This will cost L.E. 100,484.

A third project aims at strengthening the food industry production units belonging to the Ministry of Agriculture in order to enable them to satisfy some of the government agencies requirements in preserved foods. This will entail the establishment of two units for the manufacture of tomato paste and cans for preserves, as well as developing the olive-oil extraction plant. The project will cost L.E. 283,572.

AGRICULTURAL EXTENSION

Agricultural extension is provided through a number of agricultural centres, which at present number 67 each serving an area of about 15,000 feddans. The Ministry of Agriculture depends on these centres for imparting the findings of research and diffusing the requisite information to farmers.

The estimation of crops by sampling: Reliable statistical data for crop production over the whole country obtained as ealy in the season as possible are needed to formulate a sound agricultural policy and are essential for planning purposes. In view of the fact that sampling techniques provide a reliable estimate of the rate of yield for principal crops in addition to reduction of time, labour and expenses, this method has been introduced in the country since 1955 besides the objective measurement of agricultural production. Starting from 1959, this method has been applies to horticultural crops and livestock. The five-year program provides for the continuation of this project, which will cost L.E. 262 ,783.

Aerial mapping of agricultural crops: The estimation of crop production depends on surveying the area under crops and the average yield rates. In estimating the area under crops, the Ministry of Agriculture depends at present on direct measurement on the ground carried out by the Survey Department. However, the funds allocated to the Department for this purpose are only sufficient to survey 50% of the area under cotton and wheat and to survey rice and sugar cane in the main production areas. Therefore, the Ministry of Agriculture has resorted to entrusting its staff to survey the areas under other crop s. To overcome this difficulty, the Ministry considered the possibility of resorting to aerial mapping of the crop area. However, this called for undertaking a pilot survey in Menufieh Province in order to establish the accuracy of this method and the difficulties which might be encountered in its application. The project will cost L.E. 20,000.

Commodity Analysis: This project is aimed at studying the situation and outlook of major agricultural commodities in terms of production, consumption, prices and trade with a view to providing a sound basis for the formulation of production and consumption policies for these commodities. This project will cost L.E. 71,735.

Land Utilization: To ensure better land utilization, the program has included a project aimed at raising the productivity of the already cultivated lands through their classification into a number of zones according to their productive capacity in various crops. It also aims at studying the present pattern of land utilization, the relative advantage of different crops, the economics of major agricultural crops and the analysis of agricultural income as found in various zones. This project will cost L.E. 8,370.

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Statement showing distribution of Operational and Investment cost of the Agricultural Development Projects

Project	Operational Costs	Investments				GRAND TOTAL
		Constructions	Appliances & Equipment	Automotive Euipment and/or Animals	Total	
	L.E.	L.E.	L.E.	L.E.	L.E.	L.E.
Soil Improvement	520,628	63,500	67,325	32,100	162,925	683,553
Improvement & Diversification of field crops	8,404,986	1,918,350	536,035	368,735	2,823,120	11,228,106
Improvement & Diversification of fruit and truck crops	3,389,013	1,363,342	181,452	218,127	1,735,971	5,124,984
Crop Protection	11,106,666	996,140	903,400	642,400	2,541,940	13,648,606
Livestock Production	3,494,109	569,660	290,135	269,335	1,129,160	4,623,269
Animal Health	5,723,549	1,822,380	489,073	610,347	2,921,800	8,645,349
Fisheries Development	405,618	436,625	80,710	35,425	552,760	958,378
Farm Mechanization	1,247,485	126,230	688,817	22,098	837,145	2,084,630
Food Industries	313,532	43,000	142,714	4,150	189,864	503,396
Agriculture Extension	853,752	1,438,640	52,656	92,820	1,584,116	2,437,868
Consolidation of Agricultural Holdings	2,162,011	1,[illegible],699	10,801	706,500	2,000,000	4,126,011
Economic Studies	694,444	---	81,704	36,000	117,704	812,148
TOTALS	38,279,793	9,158,566	3,523,745	3,038,037	16,596,505	54,876,298

at present engaged in operating the animal-driven threshing machinery.

The generalization of mechanization

The program emphasizes the role of the State in making mechanized services available to the growers, especially to those who are not able to possess such equipment. To achieve this end the following measures have been recommended:

1) Encouraging individual growers through extension to make use of machinery.
2) Supplying machinery to existing cooperatives at reasonable prices and encouraging the formation of others while giving them the necessary guidance in selecting the appropriate type of machinery.
3) Encouraging the companies to provide mechanized services for the growers, especially where cooperatives do not exist. This is to be done under the control of the Government to protect the growers' interests, and these companies will be given ample guarantee for the continuation of their activities.
4) Fixing appropriate charges for performing various agricultural operations and seeing to it that the services shall be rendered under contract between the growers and the Agency concerned.
5) Making available the requisite number of trained technicians and workers.
6) Establishing service stations each covering 250,000 feddans in areas which do not have any of the above-mentioned services.

The program includes a project for the establishment of five service stations over a five-year period, to be located in the Provinces of Kafr el-Sheikh, Dakahlia, Beheira, Minia and Assiut. The stations, which will serve as models for further stations to be established by the companies and cooperatives, will be equipped with various kinds of machinery. Each will service an area of 25,000 feddans. The project will cost L.E. 1,520,825.

Testing the suitability of the machinery

The importation of agricultural machinery from countries with different environmental conditions from those prevailing in the country makes it imperative to test the performance of such machinery under local conditions with a view to ascertaining its suitability . Furthermore, if the country is to develop an industry for the manufacture of this machinery it will have to depend on the results of numerous experiments conducted in the local environment. Therefore, a project has been included in the program for establishing a testing station to undertake the necessary investigations on the performance of the machinery and to lay down standard specifications for various types. This station will cost L.E. 74,275.

FISHERIES DEVELOPMENT

The program set for the development of the aquatic wealth covers marine fisheries, inland fisheries, water-logged areas and lagoons, the improvement of fishermen's conditions, the improvement of fish marketing, and the processing of marine products.

Each centre includes a pilot field covering 10 feddans, a small museum, a library and bee-keeping and sericulture centres, as well as small dairy and food industry plants for demonstrational purposes.

The five-year program aims at the generalization of these centres throughout the country by establishing 58 more centres, which will cost L.E. 2,437,868. It has also provided for granting remunerative rewards, financial and moral, to outstanding growers in each province.

THE CONSOLIDATION OF AGRICULTURAL HOLDINGS

The number of small agricultural holdings in the country totals about one million holdings. This renders the adoption of modern agricultural techniques and practices difficult. The five-year program has therefore included a project for the consolidation of fragmented holdings by grouping those small units into bigger ones without affecting private ownership. However, this will not be done except with the growers' consent and under the supervision of the cooperatives and the Ministry of Agriculture. The project was started in 1960 in 100 selected villages, and will cover 1350 villages in the first five years, being scheduled for completion in ten years. Its implementation will be tied to the cooperative system as well as to the agricultural development projects in course of execution in the country. The project will entail the mapping of agricultural holdings by the Survey Department in the first two years and there after by a special group of surveyors from the Ministry of Agriculture. According to these maps the appropriate agricultural rotation will be drawn for each village. This project will cost L.E. 4,126,011.

ECONOMIC STUDIES

The development of agriculture will have to be sustained by economic studies if it is to attain its requisite objectives, for these studies are indispensable to farm planners and administrators in the proper formulation, implementation and evaluation of the development program. The five-years program therefore includes a number of projects for the promotion of statistical services and economic studies that have a bearing on the planning of agricultural development. This program will cost L.E. 812,148 and will include the following projects:

The Agricultural Census 1960/61: The conduct of the third agricultural census in the country has this time coincided with the world agricultural census for 1960/61. It will entail the collection of complete agricultural statistics on agricultural holdings, land use, field and horticultural crops, livestock and poultry population and production, agricultural employment and machinery and the pesticides used for agriculture. The census is to be conducted jointly with a number of governmental agencies, including the Statistical Department, Survey Department and Ministry of Education. The general census will be preceded by a pilot census for testing the questionnaires and finding out the difficulties which may be encountered when conducting the general census; this will, in fact, determine the final procedure for conducting it. It is planned to tabulate the agricultural census by the use of electronic equipment in order to speed up publication of the census results. This project will cost L.E. 449,311.